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Specification and Drawings, as originally filed, with Application for Patent Serial No:
2,452,291, on December 31, 2003, by **SOHEYL MOTTAHEDEH**, for "Leaf Collection
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Leaf collection in carry-ready perforated bags for blower-vacuums

Abstract

Apparatus for a one-step collection and bagging of leaves as an accessory to a power blower/vacuum. The apparatus deposits leaves and debris directly into a disposable, shoulder carryable, perforated plastic or paper bag. The bags of the invention incorporate seams for bag handling and for a neck arrangement that is readily attachable to the vacuum via a connector. The apparatus maximizes bagging capacity, avoids the chore of material transfers, eliminates the need for tying the bag before disposal and makes lawn clean-up fast, easy, and cost-effective.

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Leaf collection in carry-ready perforated bags for blower-vacuums

Description

BACKGROUND OF INVENTION

Field of Invention

The present invention relates generally to power blower/vacuum equipment and more specifically it relates to a carry-ready disposable perforated bag.

Description of the Prior Art

Various accessories have been provided in prior art that are adapted to be used in conjunction with various types of power blower/vacuums, so that users can either blow leaves to pile them or vacuum them into small fabric shoulder bags. The shoulder bags associated with hand-held blower/vacuum equipment are made of non-disposable fabric requiring that they be emptied into disposable bags - a frustrating and time consuming activity. In addition, these bags are small in capacity and require frequent emptying. Larger size leaf collection systems adaptable to fit over large garbage containers have been tried and been discontinued. They make bagging of leaves a cumbersome activity. When the bags are full, trying to extract a disposal bag compacted with leaves from a tall garbage can is difficult and requires strength. If bags are not completely filled with leaves, it may be easier to lift them out of the cans, but then holding capacity is severely reduced. Other forms of bagging by hand are considered to be a burdensome chore. Bagging by hand is often assisted by various forms of stationary bag holders to keep bags open during fill up. While these units may be suitable for the particular purpose for which they were created, leaf collection remains a cumbersome multi-step process.

Another aspect to consider in the disposal of leaves is their environmental impact which can be reduced if bags for disposal of organic elements employ biodegradable materials such as biodegradable and compostable plastics and recycled paper.

While a number of solutions have been proposed for improving collection and bagging of leaf and lawn debris using lawn mowers as lawn vacuums, little progress has been achieved in improving disposable plastic and paper bag designs to increase the efficiency of the bagging process using power blower/vacuum equipment. The present invention is both effective and efficient allowing for the easy collection of leaves into disposable bags designed for ease of handling and quick disposal.

Blower/vacuum devices of the type mentioned above are made, for example, by Black & Decker Co. called "Gas Blower/Vac" and "Vac'N' Mulch". A device of this type is also shown, for example, in U.S. Pat. No. 4,325,163 which is assigned to Allegretti & Company. The Allegretti makes also a blower/vacuum device called "Vac-N-Sac". Typically, these devices offer as accessory attachments a small leaf collection bag.

Confidential Information

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discloses in U.S. Pat. No. 5,031,297 a debris collecting and bagging apparatus provided with a supply of netting material, where debris are projected through the rigid and into the netting bag by means of an air blowing device. The blower and the collector are two separate devices. The apparatus is not hooked to a power vacuum.

et al in U.S. Pat. No. 4,747,259 disclose a grass catching discharge pipe employing a used plastic disposable bag which is missing adequate design for air removal and evenness of bag fill.

egan in U.S. Pat. No. 4,470,246 discloses an automatic complex-mechanical lawn clippings bagger that positions stored disposable bags and then moves to an operating position over the discharge chute of the power mower; this unit is missing adequate design for air removal and evenness of bag fill.

aphart in U.S. Pat. No. 4,397,063 discloses a safety bag housing containing a sparsely perforated disposable bag; this unit is missing adequate design for air removal in order to ensure evenness and completeness of bag fill. The perforated bag requires a base pan for support. The bag mouth is fully open. The bag is adapted to be connected to a power vacuum.

Machado et al in U.S. Pat. No. 4,686,546 disclose a perforated disposable bag holder for the rear of a power lawn vacuum using a long duct to fill the vertically positioned bag. The bag made of a polyethylene plastic with small air holes to vent the bag has a wide opening for entry of grass clippings and rests over a platform of a power vacuum. The bag does not have seams to make it carryable and no neck for attachment to a blower/vacuum.

Krewson in U.S. Pat. No. 3,574,210 discloses a lawn and leaves rake power vacuum where the bag is a fabric bag containing an inner perforated disposable plastic bag. The bag one end has a wide opening for entry of grass clippings coming from a power vacuum and the bag other end is attached to a support.

Voigt in U.S. Pat. No. 5,673,544 discloses a disposable lawn mower debris bag system where from a roll of perforated bags a single bag is attached to the discharge chute of a power lawn mower. The bags are perforated but need support and are of traditional configuration, have no neck arrangements, no drainage exits and no provision is made for their subsequent handling after fill up. The apparatus is not designed to be an accessory to a power blower/vacuum but rather to a lawn mower.

Kelber in U.S. Pat. 4,713,858 discloses a leaf collection apparatus for use with a blower/vacuum device which collects and discharges the collected leaves through a flexible tube into a large container. To vent air, a shroud or skirt is adapted to fit over the top of the container. While leaf collection is easily achieved by the device, is quick and without the typical problems of sagging sides and misdirected leaves when plastic bags are used, the device is cumbersome to handle. It requires strength to pull out a loaded

able bag from tall garbage-type containers that associate with the bag, a condition exacerbated if bags were to be compacted even further. The apparatus uses optional disposable bags that need to be encased and supported in a container, the bags are not perforated, have no special neck or drainage exit portals and their handling are simplified during extraction from tall containers.

Prior devices have significant shortcomings. For example, many of these devices require the direct manual transfer of debris into a receptacle, therefore are inefficient and labor-consuming. Some devices do not permit the efficient transfer of debris into a receptacle by use of air pressure, some have complex designs, are mechanically ineffective, cumbersome to use, demand tedious handling during the final bagging stage and are not cost effective. Most address problems associated with lawn mowers and the addressing problems with power blower/vacuums are cumbersome to use.

Other objects, features, benefits and advantages of the invention will become apparent in the following description of the preferred embodiments, especially when viewed in accordance with the accompanying drawings:

BRIEF DESCRIPTION OF DRAWINGS

Various additional objects, features and attendant advantages of the present invention will become more fully appreciated as the same becomes better understood from the following detailed description and accompanying drawings wherein like reference numerals represent similar or identical components throughout the several views and wherein:

FIG. 1 illustrates the overall function of the preferred embodiment of the apparatus comprised of a disposable, shoulder carryable, perforated bag that is attached to a handheld blower/vacuum device via a connector. As shown, the operator collects leaves directly into a disposable bag and bags them in a single-step operation.

FIG. 2 is a perspective view of the preferred embodiment of the apparatus showing a disposable leaf bag having holes located in at least half of bag upper section. The top and upper seams create a casing arrangement for inserting a rod-like handle to support and carry the bag by a shoulder strap during both the vacuum operation and after for handling the bag in an autonomous way. The view shows also a connector pipe to which is attached the border of the bag neck by means of a fastener such as a split ring pipe clamp.

FIG. 3 is a perspective view of the preferred embodiment of the perforated bag which has three seams; a first top seam that provides in cooperation with a second upper seam a casing arrangement for inserting a handle to carry the bag. An insertable rod-type handle is also shown in FIG. 3. The elongated upper seam closes substantially the bag top and ends with a downward vertical neck arrangement. The traditional bottom seam closes the bag bottom.

is a perspective view of an alternate disposable perforated bag design that has a seam cooperating with the upper seam to create a casing arrangement for inserting a handle such as an S-shape hanger-type handle also shown in FIG. 4. The upper seam closes substantially the bag mouth and extends obliquely to create a neck configuration for easy fastening to a vacuum connector pipe, the bag being made of plastic or paper. In this alternate bag design, the bag has also two openable drainage exits that are integrated as part of the generally U-shaped contour of the bag bottom.

FIG. 5 is a perspective view of an alternate bag design that has only an upper seam that closes partially the bag and which ends with a descending vertical seam to create a neck arrangement. A rectangular vacuum connector of the apparatus is also shown in FIG. 5. The bag is also drainable as in FIG. 4.

FIG. 6 is a perspective view of a drainable bag design that has a downward vertical light-lined neck arrangement with a pattern of perforation holes mainly located at bag top section with exception of one line of holes located just above the bag bottom seam; this line of holes is closed with a detachable adhesive tape for drainage of liquids or increase of air venting.

FIG. 7 is a perspective view of an alternate perforated fully closed bag design that has perforation holes located over the entire bag surface. This universal size bag allows to select the desired neck width for multiple applications and multiple neck sizes and neck shapes. The bag has a full-width horizontal upper seam located just above a full-width horizontal perforation line. The extent of tearing of a bag strip located just above and along the perforation line determines the width of the desired neck size to fit the perimeter of a selected connector. For wide necks, the bag strip can be used as a tie to close the filled bag.

FIG. 8 is a close-up perspective view of a disposable perforated closed bag that has a handle insertable feature but where a perforation line extends only partially just below the upper seam, under the empty space provided besides the handle casing arrangement. As in FIG. 7, the extent of tearing of a bag strip located just above and along the perforation line determines the width of the desired neck size to fit the perimeter of a selected connector.

FIG. 9 is a cross-sectional view of a wide jaw alligator-type clamp hingeable from the top.

FIG. 10 is a cross-sectional view of an alligator-type clamp hingeable from the side with extension arms to embrace a vacuum connector pipe. FIG. 10 shows also the top view of the connector pipe as positioned in the bag neck arrangement. Also is shown a slidable clamp lock that has a loop for attachment to a strap.

FIG. 11 is a perspective view of the disposable perforated bag of FIG. 8 which neck arrangement is attached to a rectangular-type vacuum connector by means of a resilient

stener and which handle casing arrangement is inserted by an S-shape hanger-type that can be carried by shoulder strap means or by a hook positioned on the blower/vacuum device.

FIG. 12 is a perspective view of a perforated bag which top is supported by an elongated member of the alligator-type clamp having wide jaws hinging from the top enabling the bag to be carried during the vacuum operation and for handling independently and autonomously the bag after dismounting from the connector and the power blower/vacuum.

FIG. 13 is a perspective view of a perforated bag which top is held by an elongated member of the alligator-type clamp having two long jaws hinging from the side and having extension arms that embrace the bag connector pipe. This clamp fastener limits variation in distance between the clamp and the connector pipe to avoid possible tearing of the plastic bag. A drainage exit portal at the bag bottom corner is also visible and a detachable pull tab.

FIG. 14 is a perspective view of a perforated paper lawn refuse bag provided with a top opening to insert a handle, an upper seam closing substantially the bag mouth leaving an open neck arrangement which border is clamped around to a connector pipe mountable to a power blower/vacuum.

SUMMARY OF INVENTION

It is a purpose of this invention to overcome deficiencies noted in the aforementioned prior art. This includes providing an apparatus that expands the use of existing equipment such as power blower/vacuums and collection and bagging equipment of the like, whether engine or electrically operated.

One purpose of the invention is to provide an improved bag handling system wherein the combined arrangement of various seams create a handling arrangement that makes the bag autonomously carryable. With the bag handling arrangement of the invention, a user can select to either lift a collection bag from the ground, carry it or drag it exerting little effort by using the shoulder strap of the invention or can select to leave the ground carry the bag's weight during bag loading, thus avoiding the need to carry the bag's weight unnecessarily.

Another purpose of the invention is to provide a fast, easy and cost-effective apparatus that in a single step collects leaves, bags leaves directly into a perforated bag ready to be carried and disposed without the need to tie the bag and avoids double material transfers of the prior art.

Another object of the invention is to provide a disposable bag, plastic or paper, that maximizes the bag's capacity for containing leaves.

her object of the invention is to provide an environmentally responsible bag that
 acts a maximum amount of leaves in a biodegradable plastic or paper bag that is
 uately vented to promote faster composting.

ther purpose of the invention is to improve the design of consumer garbage bags
 rein said improvement results directly into a reduction of the cumbersome and time-
 suming bagging chore. Ease of handling is further accomplished by providing various
 size to accommodate the bagging activity by persons of various sizes.

other purpose of the invention is to provide a safe bagging system wherein any solid
 1 picked up by the vacuum and ejected via the chute is safely projected downwards,
 /ard the ground.

other purpose of the invention is to increase child safety by providing safer bags that
 vented, thus reducing the risk of suffocation in case bags are used by children for
 1er purposes.

iother object of the invention is to provide an accessory to existing power
 1wer/vacuum equipment that provides a collection and a bagging apparatus that is
 nple in design, quickly mountable and dismountable, economical in cost to
 anufacture and requires very little storage space.

further purpose of the invention is to provide a collection and bagging system that is
 stomizable to different types of vacuumable elements, dry or wet, by matching the
 ature of the elements, the size, shape and air venting requirements of the collection bag
 nd the amount of air produced by the specific power vacuum employed. Besides leaves,
 ther vacuumable elements such as seeds, small fruits, debris, wood chips, wet and dry
 ood-processing residues, wet residues, objects from assembly lines or factories, and
 lements of the like can be vacuumed and discharged in a perforated plastic bag, for
 ither storage or disposal purposes. With a bag made from cellulose or other edible
 material, its contents including the bag, can be consumed in whole by any of a variety of
 grazing animals.

Yet, another purpose of the invention is to provide a collection and bagging system that is
 tailored to different types of wet vacuumable elements, wherein liquids vacuumed along
 with wet elements and accumulated at the bottom section of the bag may be drained via a
 set of drainage exit portals that are openable by detaching an adhesive tape and in another
 preferable embodiment of the invention by tearing removable tabs built as integral part of
 the plastic bag. Drainage can be useful for activities such as composting. In addition
 drainage of liquids from perforated bags can be useful for straining liquids such as rain,
 sewer, washes from solid materials from the environment or from residues ejected from
 transformation. Drainage is also useful for washing fruits, vegetables and materials of the
 like and draining and sieving of the used waters or liquids, for future storage or disposal.

Another purpose of the invention is to collect and bag rapidly leaves and other
 compostable materials in substantially closed large sized, perforated, paper lawn refuse
 bags using the handle and shoulder strap arrangement of the invention associated with a

vacuum is an environmentally responsible activity. Furthermore, loaded paper e easily and autonomously handlable and liftable with the handle and shoulder rramgement of the invention.

I purpose of the invention is to collect and bag edible material consumable by any ariety of grazing animals in a bag of the invention made from cellulose or other material, wherein its contents together with the bag itself can be consumed in : by any of a variety of grazing animals.

er objects of the invention will appear as the description proceeds.

TAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

r with reference to the drawings, a one-step leaf collection, bagging and subsequent handling in a perforated bag, employing the principles and concepts of the present ntion will be described in detail. The four cooperating elements of the preferred odiment of the apparatus are comprising: a disposable perforated bag 10, an rtatable handle 32 attachable to a strap 80, a mountable connector 24 and an attaching lity such as fastener 120 to fasten said bag 10 to said connector 24.

th particular reference to FIGS. 1 and 2, it can be seen that bag 10 is attached to a ndard power blower/vacuum 20 operating in a vacuum mode. The said power vacuum includes an engine 23 that, for example, can be of the internal combustion or electric es. Said engine 23 is generally held by hand or by shoulder strap means. The power cum 20 has an integral discharge chute 22 that directs collected leaves rearwardly rough the attachable connector 24 that holds the bag 10. The collected leaves forced rough said discharge chute 22 enter the perforated bag 10. Bag 10 is best made of aterials traditionally used for any standardly available disposable bag formed from olypropylene, polyethylene or other suitable material modified according to the design f the invention, but preferably of biodegradable plastic and of compostable paper. In one mbodiment, the bag 10 is made of cellulose or other edible material, where bag 10 and ts contents can be consumed in whole by any of a variety of grazing animals. When said ag 10 is made of plastic, the bag 10 comprises a thickness of approximately 1-6 mil or 0.001-0.006 inches and preferably about 1-2 mil or 0.001-0.002 inches. The bag also comprises a volume consisting from the group of 60-200 liters and about 15-50 gallons.

The general downward position of the connector 24 provides the safety of directing any solid item picked up by the vacuum and ejected via the chute, to be safely projected downward, toward the ground. The bag 10 is not encased and is not supported at its bottom. The bag 10 is liftable and carryable by said shoulder strap means 80, the strap attached at two points 82 and 84 during vacuuming (see FIG. 2). In all embodiments of the invention, after the bag 10 is fully loaded, bag 10 can be fully detached from the power vacuum 20 and the connector 24 and autonomously and independently moved, lifted or dragged using the bag handle 32 and shoulder strap 80 of the invention (see FIG. 12). In other embodiments of the invention (see FIG. 13), the same autonomous handling of the bag 10 is achieved using an elongated fastener 40.

s of the numerals 40, 120 and 32 can be formed from materials selected from the of aluminum, hard plastic, metal, wood, resilient material and combinations

preferred embodiments of the invention (see FIGS. 1, 2, 3, 4, 11 and 14), the thus comprises a preferred bag design that facilitates insertion of a handle 32. In preferred bag design, bag 10 has a top seam 62 for creating, inside bag 10, a arrangement 63 enabling insertion of a handle 32. Said top seam 62 extends from distal end to a distance extending at least one quarter of bag width, the remaining bag at bag proximal end, constitutes a space 61 allocated for bag attachment to the connector 24. In this preferred embodiment of the bag 10, said space 61 is an empty space. In said preferred embodiment, bag 10 has three generally horizontal seams:

1. top seam 62 for inserting, as described earlier, a rod-like handle 32 extending from distal end to a distance at least half of bag width. A small, generally vertical side cut at bag distal end opens the way for inserting said handle 32 inside and through said bag arrangement 63;

2. second seam 64, parallel to and approximately 2-15 cm lower than said top seam 62, closes substantially the bag mouth on bag distal end but leaves a narrow open mouth referred to as a neck 50 having approximately an opening of 11-60 cm in width said neck located on bag proximal end, distances being measured with bag laid flat on a flat surface. The horizontal seam 64 ending with a downward oriented vertical seam 67 giving a height of approximately 1-20 cm (see FIG. 3). Said downward oriented seam 67 is configured as a downward oriented straight-lined seam (see FIG. 6) in another embodiment of the bag 10. The narrow neck 50 is bordered on bag proximal end by bag flaps 14. The relatively constricted neck 50 eliminates substantially the need for tying a fully loaded bag before disposal. The relative lower position of neck 50 in relation to handle 32 facilitates generally a user's movements.

3. third bottom seam 68 extending the full width of bag 10 seals the bag bottom.

In use, discharge through connector 24 containing air and leaves 30 will inflate bag 10 to its fullest potential with leaves 30 being held in bag 10 and the air being filtered out by the perforated holes 12. To properly vent exiting air, an appropriate number and concentration of holes needs to be punched in at least half of bag upper section to avoid burst of the plastic or paper bag 10 by excess air pressure generated from the vacuum discharge pipe 24.

Conveniently, the bagging system has the advantage that, as bag 10 fills up with more and more leaves preventing air exit from perforated holes 12 at bag top, and as the collected material packs up with leaves reaching the exit level 28 of the vacuum pipe connector 24, leaves start to obstruct air entry into bag 10 and create a back pressure, a self-compensating condition that effects and reduces air intake of the power vacuum 20.

Bag 10 of the preferred embodiment has plural perforated holes 12 for air venting, the bag contains about 1-8 holes per centimeter or about 2-20 holes per inch, said holes 12 punched or pressed into bag 10 during manufacturing. When bag 10 is used for collecting

for other organic and non-organic vacuumable elements, bag hole positioning on bag 10 follows a pattern with hole sizes and hole numbers matching the nature of elements to be vacuumed, their degree of wetness, the accepted amount of dust to escape from holes 12 and more importantly the amount of air produced by the power vacuum 20 employed. For example, for collection and bagging of damp material 30 in bag 10 known as giant-size bag for the garden, size 79x117 cm or 31x46 inches, a minimum of 300-500 holes of 6 mm in diameter located in at least half of bag section, distributed in a generally rectangular pattern is recommended. This allows for approximately an air discharge of 250-350 CFM generated from a standard power vacuum having an electrical motor of about 1500 Watt attached to a connector pipe 72 mm in cross-sectional diameter. For collection of smaller size elements than material 30, for example seeds or peanut trash in a food-processing factory, when using the power vacuum 20, it is recommended to use bag 10 having a minimum of 1000-1500 holes of preferably 2-4 mm in diameter. Generally, too many holes weaken the bag strength while insufficient number of holes reduce efficiency of the apparatus. Similarly, large size holes allow too much dust to escape, a matter of lesser importance when vacuuming leaves in an open garden environment than when vacuuming dry elements in a closed environment such as in a factory. A bag 10 having optimized size holes of 4 mm (5/32) inch in diameter is recommended for a general purpose perforated bag of the invention. Bag 10 is generally constructed with all seals or seams sealed together by local melting with a hot surface or heat sealing; however, alternate fastening methods potentially employed such as sewing, buttoning, or stapling. Covering

the group of bag embodiments that have a top seam 62 to facilitate handle insertion, a second embodiment of bag 10 (see FIG. 4) has three generally horizontal seams: first top seam 62 extending at least half of bag width, said seam 62 creating a casing arrangement 63 for inserting a handle 32,

second upper seam 64, generally parallel to and approximately 2-15 cm lower than the first seam 62, said upper seam 64 closing substantially mouth of bag 10 on bag distal end but leaving a narrow open neck 50 of approximately 11-60 cm wide on bag proximal end. The horizontal seam 64 ending with a vertical straight-lined seam 67, creating an upward oriented neck arrangement, oblique about 45 degree clockwise, readily attachable to a connector pipe 24. In this embodiment of bag 10, a rounded V-shaped open space 61 separates the horizontal top seam 62 from the bag section incorporating the angled neck seam 67.

A third seam 68 comprised of a generally horizontal seam 68 for closing bag bottom has optionally a bag bottom seam having a wide U-shaped configuration, said bottom seam 68 incorporating the contour of two drainage exit portals 52 and 54 making the bag 10 drainable. Said drainage exit portal 52 is located at bag bottom one corner, said portal 52 openable by tearing locally a segment of bottom seam 68, said tear best achieved by pulling the tearable pull tab 92 to release liquids trapped above seam 68. Pull tab 92 is delimited by two peripheral notches 91 and 93. A similar configuration applies for drainage exit portal 54.

in the same group of bag embodiments that have a top seam 62 to facilitate handling, a third embodiment of bag 10 (see FIG. 8) is provided with also three generally horizontal seams:

first top seam 62, a second upper horizontal seam 64 closing fully width of bag mouth of the bag 10 further comprising a short perforation line 90 located just below said opening 61 on bag proximal end, the tearing of said perforation line 90 providing a desired neck width.

In another group of embodiments of bag 10 wherein bag handling is achieved by seizing bag 10 using an elongated clampable fastener 40 selected from the group of alligator-type fasteners, a first alternative bag design (see FIGS. 5, 6, 7 and 13) comprises two seams: first upper seam 64 having a substantially long horizontal seam 64 ending with a downward oriented vertical seam 67 creating a border for neck 50. Neck 50 other border being delimited by bag walls 14.

In various embodiments of bag 10, the pattern for locating holes 12 comprises holes perforated in locations selected from the group of holes located preferably in at least one quarter of bag 10 upper section (see FIG. 4), holes located on the entire surface of bag 10 (see FIG. 7) and a concentration of holes located mainly in at least one quarter of bag 10 upper section with exception of one line of holes 11 located just above bag bottom seam 13 (see FIG. 6). Said line of holes 11 being covered by a detachable adhesive tape 88 rendering bag 10 drainable for drainage of liquids from bag 10 and for increasing air venting.

In yet another embodiment of the invention (see FIG. 7), a universal bag 10 with a selectable neck size is provided. In this embodiment, bag 10 is fully closed with a top seam 64, and has a full-width perforation line 90 just below said seam 64. The width of the bag neck opening is selectable by tearing a horizontal strip 16 of a selectable size along said perforation line 90. Said top seam 64 eliminating the need for further tying of a loaded bag when said strip 16 is short in length, and when said strip is long for providing a wide neck 50, said strip 16 is made available as an elongated band for tying the loaded bag, said top seam maximizing the bag holding capacity.

Use of bag 10 provides multiple advantages. A perforated vented bag increases child safety by decreasing health risks caused by suffocation. Also, using biodegradable material such as biodegradable plastics and paper is environmentally responsible.

When providing bag 10 with venting holes 12 as shown in various embodiments of the apparatus (see for example FIG. 3), the composting process in organic materials stored in bag 10 is notably improved.

The preferred pattern selected for localizing holes 12 (see FIGS. 1, 2 and 3) is a pattern wherein holes 12 are concentrated in the upper section of bag 10. Said preferred pattern optimizes air venting primarily when bag 10 reaches its full capacity. Furthermore, avoiding to position holes in bag lower section eliminates the possibility of having wet materials collected in bag 10 to release their liquids or moisture out of bag bottom holes 12. For applications in which drainage of liquids is desirable, other embodiments of the

provide a pattern wherein holes are located on the entire surface of the bag (see 7) or mainly concentrated in the bag upper section except for a line of holes at the bottom, said line of holes covered by a detachable adhesive tape (see FIG. 6). In yet another embodiment of the preferred drainable bag 10, the bag 10 has two openable bag exit portals.

It is also known that because of environmental concerns and an increasing interest in composting, using large size biodegradable and compostable paper bags such as 12"x33" size and 30 gallons in capacity, for collection and bagging of compostable materials such as leaves, is gaining public interest. However, such an activity is considered so cumbersome that enormous efforts on behalf of governments and environmentalists have been needed to convince people to use paper bags as an alternative solution to plastic bags. The solution provided by the present invention solves many problems associated with the burdensome activity of collection and bagging of lawn debris such as leaves into traditional paper bags also known as paper refuse bags. The subsequent problem of handling and of lifting a large paper bag filled with lawn debris, another source of concern for users, is also resolved by the present invention. Furthermore, the invention provides a solution for the substantial minimization of the need to tie the paper bag 10 while allowing bag 10 to be filled to its fullest capacity, beyond the traditional capacity limit known generally for a traditional paper bag.

In one embodiment of the apparatus providing a paper bag 10, said paper bag 10 is best made of paper selected from the group of one-, two- and three-ply paper, of wet-strength paper, of cellulose and other edible material consumable by any of a variety of grazing animals and combinations thereof. The paper bag 10 is attachable to a hand-held power blower/vacuum 20 via a connector pipe 24, said paper bag 10 able to collect organic materials such as leaves, grass clippings, pine needles, weeds, chipped prunings, spent garden plants, cellulose and other edible material where said bag and its edible contents can be consumed in whole by any of a variety of grazing animals and combinations thereof, said paper bag 10 having a capacity of 15-50 gallons. Said paper bag 10 has generally seams and seals selected from the group of standard sewn seams, "tape over sewn" seals - hot-melt tape over the sewing - to prevent water leakage from the bottom, wax-dipped bottoms, wax-dipped tape ends for eliminating wicking of water and combinations thereof. The paper bag 10 comprises three horizontal seams:

a first top seam 62 for inserting a rod-like handle 32 extending from paper bag distal end to a distance at least one quarter of paper bag width. A small generally vertical side cut 11 on bag distal end opens the way for inserting handle 32 inside and through said casing arrangement 63;

a second seam 64, parallel to and approximately 5-15 cm lower than said top seam 62, closes substantially the bag mouth on bag distal end but leaves a narrow open mouth referred to as a neck 50 having approximately an opening of 11-60 cm in width and a height of approximately 2-20 cm in height, said neck located on bag proximal end, distances being measured with bag laid flat on a flat surface. The horizontal seam 64 ending with a seam orientation selected from the group of downward oriented seam 67 as

as in see FIG. 3 and angled upward seam 67 as shown in FIG. 4. The narrow neck 50 is formed on bag proximal end by bag walls 14. The relatively constricted neck 50 minimizes substantially the need for tying a fully loaded paper bag before disposal. In a downward seam 67, the relative lower position of neck 50 in relation to handle 32 facilitates generally the user's movements. A third bottom seam 68 extending the full width of bag 10 seals the bag bottom.

In the preferred embodiment of the apparatus, a connector 24 is provided (see FIG. 1 and 2) and said connector 24 having a sleeve end 26 that is attachable to a vacuum air outlet 22 and a discharge end to which said disposable perforated bag is attachable to by a fastener means 120. The connector 24 is made of the same plastic material provided for manufacturing other tubular parts of the power blower/vacuum 20. The connector 24 is selected from the group of connectors having a round-type casing, an elongated pipe-type casing (see FIGS. 2 and 13), a rectangular-type casing (see FIGS. 5 and 11), an oval-type casing (not shown), a flexible type casing (not shown), a permeable type casing (not shown), and combinations thereof, all said connectors having a sleeve end 26 attachable to said vacuum air outlet and a discharge end 28 to which the border of said bag neck arrangement 50 can be attached onto. The connector 24 is cost effective to manufacture and requires little storage space.

In the preferred embodiment of the apparatus, generally, two sections of bag 10 are attachable by two fastener means, a first section is comprised of the border of bag neck 50 attachable by a first fastener means 120 to a bag insertable connector 24 through which the power vacuum 20 discharges air and leaves into bag 10, and a second section is comprised of an elongated bag section taking the shape of a casing 63 inside which is inserted an insertable-type fastener configured as an elongated rod-type handle supported at its two side ends by a shoulder strap

The space provided between the first top seam 62 and upper seam 64 creates a casing or a pocket arrangement 63 where said casing 63 is insertable by an elongated handle 32, preferably of rounded shape such as a rod or a pipe, said handle 32 having rings 34 and 36 positioned at each end on the handle sides, said rings 34 and 36 attachable to a shoulder strap 80. In an alternate embodiment of the handle, the rod-like handle 32 is selected from the group of wood rods having two holes at rod end, metal rods flattened at each end to contain a hole, an S-type metal hanger (see FIGS. 4 and 11), a metal pipe of the mop-handle type with a plastic hanger-hole at each end, a plastic pipe with a hole at each end and combinations thereof; the length of said handle matching the length of said casing arrangement.

In this preferred embodiment of the invention and all other embodiments of the apparatus, to attach bag 10 to connector 24, the said first fastener means 120 is selected from the group of fasteners comprised of two semi-circular hingeable elements such as split ring pipe clamp (see FIG. 2), fasteners having latching means such as quick release latch, over-center latch (not shown), fasteners having clamping means such as spring loaded band clamp (not shown), wrappable fasteners having resilient strap means such as rubber bands and elastic straps (see FIG. 11), cord and a VELCRO band. VELCRO is a

mark for a fastener consisting of hooks and loops (not shown) and combinations thereof. All fasteners that have not been identified in drawings are standard fasteners that are well known to those skilled in the art.

In other embodiments of the apparatus, the elongated fastener 40 is used to seize at least one end of the bag 10 width at bag highest horizontal section for handling of bag 10. This fastener 40 may be a clampable fastener 40 carryable by shoulder strap means.

In one embodiment, elongated fastener 40 is selected from the group of alligator-type clamps.

In one embodiment of the apparatus, a clampable fastener 40 seizes, supports and handles bag 10 by means of a lockable bag fastener 40 of the alligator type which top view is shown in FIG. 9, said clamp seen in an open position with neck 50 of bag 10 positioned between linear and long jaws 42 and 44 and connector 24. The inner side of the linear and long jaws 42 and 44 are lined with resilient means 100 for better grip. Jaws 42 and 44 hinge round pivot point 112 located on the distal side of bag 10. Fastener 40 is lockable by positioning U-shaped lock 45 on fastener 40. Fastener 40 has two rings such as ring 114 attachable to a shoulder strap (see FIG. 10). Two optional semi-circular extension arms 41 and 43 attached to said jaws 42 and 44 are provided to embrace loosely the connector 24 without clamping it in order to permit the distance variation between the clamp fastener 40 and the border of bag narrow width opening 50, said neck 50 fastened by other means than fastener 40 to the connector 24. Limiting said distance variation prevents undue tensions on plastic bag 10 when the user makes large movements with the power vacuum 20. In this type of fastener 40, attachment of the bag neck 50 to the connector 24 is best achieved by a fastener of the resilient band type 120 (not shown) or of the VELCRO band type (not shown) for a plastic bag 10 and of split ring pipe clamp 40 for a paper bag 10 (see FIGS. 10 and 14).

In another embodiment of the alligator type fastener 40, the fastener has two linear wide jaws 42 and 44 hingeable around pivot point 112 (see FIGS. 10 and 13). Said clamp fastener 40 is hingeable from the side of bag 10 and is coupled to a shoulder strap 80 for handling bag 10 during the vacuuming operation as well as handling and lifting bag 10 autonomously, without need of attachment to the connector 24. Fasteners of the type 40 can be formed from aluminum, hard plastic, wood or other suitable material.

For using the preferred embodiment of the apparatus, the handle 32 having two side rings 34 and 36, having side rings 32 hooked to one end of strap ends 82, is inserted inside the bag casing 63 until reaching the other casing extremity at which point strap other end 84 is hooked to side ring 36.

Once the empty bag 10 is hung by shoulder strap to the side of the user, the connector sleeve end 26 is mounted to the power vacuum 20 and the connector 24 other end is inserted into the bag neck 50 with the border of neck 50 fastened tightly around said connector 50 using an attaching facility such a fastener 120 selected from the group of split ring pipe clamp as shown in FIG. 2, quick release latch, over-center latch, spring loaded band clamp, resilient band (see FIG. 11), cord and a VELCRO band (not shown). VELCRO is a trademark for a fastener consisting of hooks and loops.

power blower/vacuum operating in vacuum mode is turned on. The incoming air fills bag 10 and entrains leaves that are retained in the bag while air is vented out through bag holes 12. The user lifts the bag from the ground exerting little effort because of the user's shoulder strength when using the shoulder strap of the invention. The user can also select to let bag's weight to be fully carried by the ground during the vacuuming operation and lift the bag only when required. Gradually, bag 10 is filled, compacted by the vacuum and again filled with leaves until the bag 10 reaches its maximum capacity, from bottom seam to upper seam. At that point, bag 10 is detached from the power vacuum 20 through the connector 24 and without requiring to tie the bag narrow neck or dismounting the handle 32 with its associated shoulder strap arrangement 80, bag 10 is easily lifted and carried despite its weight - the handle and shoulder strap arrangement of the invention providing an autonomous way for handling fully loaded disposable plastic leaf bags 10 or fully loaded paper lawn refuse bags 10.

Bag 10 provides the general advantage that incorporating a top seam 64 that closes substantially the bag mouth while providing a narrow neck arrangement 50 provides an additional condition wherein the capacity for containing leaves in bag 10 is maximized. This feature applies for any reasonable size plastic and paper vacuum bag of the invention. It is known that in traditional bags, the need to create a neck around which to tie a rope or twist a metal tie causes generally loss of holding capacity.

FIG. 7 shows an embodiment of the apparatus comprising the perforated universal neck size bag 10 best made of any of biodegradable plastic, polypropylene, polyethylene film of 1-6 mil thickness or 0.001-0.006 inches, preferably about 1-2 mil or 0.001-0.002 inches. Said bag having a capacity of 60-200 liters or 15-50 gallons, having vent holes 12 of 1-6 mm in diameter, said holes 12 located in at least half of bag upper section of bag 10, said bag having a mouth fully closed and fully extended perforation line 90 just below the closed top seam, tearing of said perforation line 90 resulting into creation of a bag neck 50 preferably of 11-60 cm, distances measured with bag laid flat on a flat surface, the neck opening created by tearing to a desired neck width the bag strip located over the perforation line 90. The bag bottom seam 68 has a general U-shaped configuration with two openable drainage exit portals 67 and 69 at bag bottom corners, each drainage exit portal openable by tearing respectively adjacent peripheral pull tabs 77 and 79. The bag top is clamped to a lockable alligator clamp type fastener 40 supportable by shoulder strap means 80.

Optionally, one end of the bag fastener clamp jaws is extended with two arms 41 and 43 to embrace loosely connector pipe 24 in order to control the variation in distance between the bag neck arrangement 50 and the clamp fastener 40, thus eliminating the risk of high stress potentially placed upon the bag seams causing failure under some circumstances or tear of the plastic and paper bag 10 between said two moving components of the apparatus.

FIG. 7 shows an embodiment of the apparatus comprising the perforated universal neck size bag 10 best made of any of biodegradable plastic, polypropylene, polyethylene film of 1-6 mil thickness or 0.001-0.006 inches, preferably about 1-2 mil or 0.001-0.002 inches. Said bag having a capacity of 60-200 liters or 15-50 gallons, having vent holes

f 1-6 mm in diameter, said holes 12 located in at least half of bag upper section, said having a mouth fully closed by seam 64 and a fully extended perforation line 90 just above the closed top seam, cutting of said perforation line 90 resulting into creation of a neck 50 preferably of 11-60cm, distances measured with bag laid flat on a flat face, the neck opening created by tearing to the desired neck width the bag strip over perforation line 90. The bag bottom seam 68 has a general U-shaped configuration with two openable drainage exit portals 67 and 69 at bag bottom corners, each drainage exit portal openable by tearing adjacent peripheral pull tabs respectively 77 and 79. The bag top is clamped to a lockable alligator clamp type fastener 40 supportable by shoulder strap means 80.

Obviously, numerous modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described herein.

m:

one-step collection, bagging of leaves and debris and bag handling apparatus for attachment to a hand-held portable vacuum device including a vacuum air outlet for carrying leaves and debris from said vacuum directly into a disposable perforated bag, apparatus comprising:

means for fastening said disposable perforated bag to said vacuum air outlet;

removable disposable perforated bag, said bag perforated with holes substantially 1-6 mm in diameter to vent air, the bag having plural generally horizontal seams comprising a first top seam cooperating with an adjacent second upper seam to provide a casing arrangement for inserting a rod-like handle, said casing covering at least one quarter of said bag width on bag distal end, the remaining bag width having an empty space on bag proximal end, said second upper seam closing partially the bag mouth on bag distal end; the remaining open mouth space on bag proximal end providing a neck arrangement, said neck arrangement attachable to said vacuum air outlet, and a third bottom seam holding bag content; and

an elongated rod-like handle, said handle insertable into said bag casing for carrying the bag.

2. The apparatus of claim 1 wherein said holes of 1-6 mm in diameter perforated in said bag are located in at least half of bag upper section of the bag.

3. The apparatus of claim 1 wherein said holes of 1-6 mm in diameter perforated in said bag are selectively located over the entire surface of the bag.

4. The apparatus of claim 1 wherein said bag neck opening is approximately 11-60 cm wide.

Confidential Information

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pparatus of claim 1 wherein said second upper seam closing partially said bag closes fully said bag width and further comprises a perforation line located just said second upper seam, the length of said perforation line extended to the length open space on bag proximal end, the extent of tearing of the length of a bag strip over and along said perforation line determining the opening width of said bag neck arrangement.

apparatus of claim 1 wherein said horizontal second upper seam proximal end ends with a short vertical seam to form an open neck arrangement and wherein the neck width of said neck is approximately 11-60 cm and the height of the neck is approximately 2-20 cm.

apparatus of claim 1 wherein said disposable bag is drainable and further comprises a drainage exit portal positioned at each side of bag bottom corners, the four of said drainage exit portals integrated as part of said third bottom seam, each of drainage exit portals openable by means of a detachable pull tab.

apparatus of claim 1 wherein said bag is made of biodegradable plastic.

he apparatus of claim 1 wherein said bag is made of plastics selected from the group polypropylene film and polyethylene film.

The apparatus of claim 1 wherein said bag is made of paper.

The apparatus of claim 1 wherein said plastic bag further comprises a thickness of approximately 1-6 mil, preferably about 1-2 mil.

. The apparatus of claim 1 wherein said bag further comprises a volume consisting from the group of 30-200 liters and about 8-50 gallons.

13. The apparatus of claim 1 wherein said rod-like handle insertable into said casing arrangement is selected from the group of wood rods having two holes at rod end, metal rods flattened at each end to contain a hole, S-type metal hangers, metal pipes of the top-handle type with a plastic hanger-hole at each end, plastic pipes with a hole at each end and combinations thereof, the length of said handle matching the length of said casing arrangement.

14. The apparatus of claim 1 wherein means for fastening said disposable perforated bag to said vacuum air outlet is provided via a connector means selected from the group of connectors having a round-type casing, an elongated pipe-type casing, a rectangular-type casing, an oval-type casing, a flexible type casing, a permeable type casing and combinations thereof, all said connectors having a sleeve end attachable to said vacuum air outlet and a discharge end to which the border of said bag neck arrangement can be attached onto.

apparatus of claim 1 wherein means for fastening said border of said bag neck onto said discharge end of said vacuum air outlet is further provided by a means selected from the group of fasteners comprised of two semi-circular elements such as split-ring pipe clamp, fasteners having latching means such as release latch, over-center latch, fasteners having clamping means such as spring band clamp, wrappable fasteners having resilient strap means such as rubber, elastic straps, cords, VELCRO bands and combinations thereof.

the apparatus of claim 1 wherein the combination of said casing with said handle gement enables the bag to be carried autonomously.

a one-step collection, bagging of dry and wet vacuumable elements and bag handling apparatus for attachment to a hand-held portable vacuum device including an air outlet discharging said elements directly into a carryable disposable perforated bag, said apparatus comprising:

carryable disposable perforated bag, said bag perforated having holes substantially 1-6 in diameter to vent air, the bag having plural generally horizontal seams comprising first upper seam closing a section of the bag mouth on bag distal end but leaving a bag opening on bag proximal end for creating a neck arrangement, said neck arrangement attachable to a connector, and a bottom seam holding the bag content;

connector having a sleeve end attachable to said vacuum air outlet and a discharge end which said neck arrangement of said disposable perforated bag is attachable to;

bag neck fastener selected from the group of fasteners having clamping means, resilient strap means to fasten said bag neck onto said connector and combinations thereof;

an elongated fastener to seize a segment of the bag top to carry the bag weight.

8. The apparatus of claim 17 wherein said upper seam eliminates the need for further tying of a filled bag when said neck opening is small and when the neck opening is large, using said bag strip as a tie for tying said filled bag.

19. The apparatus of claim 17 wherein said upper seam maximizes the bag holding capacity when said neck opening is relatively small.

20. The apparatus of claim 17 wherein said holes of 1-6 mm in diameter are perforated in at least half of bag upper section with an exceptional line of holes perforated at bag bottom section, said line of holes covered by a detachable adhesive tape.

21. The apparatus of claim 17 wherein said horizontal upper seam proximal end descends with a short vertical seam to form an open neck arrangement and wherein the entrance width of said neck is approximately 11-60 cm and the height of the neck is approximately 2-20 cm.

apparatus of claim 17 wherein said elongated fastener further comprises r-type clamps having jaws, said clamps selected from the group of clamps having jaws hingeable from the top, clamps having long jaws hingeable from the side and variations thereof.

the apparatus of claim 22 wherein jaws of said clamps have extension arms that engage loosely said connector and cooperate hingingly and radially with the connector.

the apparatus of claim 17 wherein said disposable bag is drainable and further comprises a drainage exit portal positioned at each end of bag bottom corners, the number of said drainage exit portals integrated as part of said bottom seam that holds the content, the drainage exit portals openable by means of detachable pull tabs.

A carryable disposable perforated leaf bag able to receive, collect, bag and handle in a one-step leaves and debris discharged from a hand-held portable vacuum device, said comprising:

radial perforated holes, located over said bag, said holes punched or pressed by means of a perforation covering about 1-8 holes per cm and about 2-20 holes per inch, said holes substantially 1-6 mm in diameter but preferably 4 mm or 0.1574 inch in diameter to vent, said holes distributed over the bag following a pattern selected from the group of patterns wherein holes are located preferably in at least half of bag upper section, where holes are located on the entire surface of the bag, where holes are located in at least half of bag upper section with exception of one line of holes at the bottom, with said line of holes covered with a detachable adhesive tape and combinations thereof;

the bag having plural generally horizontal seams comprising:

a first top seam cooperating with an adjacent second upper seam to provide a casing arrangement for inserting a rod-like handle, said casing covering at least one quarter of said bag total width on bag distal end, the remaining bag width being an empty space on bag proximal end, said bag carryable via said handle preferably by shoulder strap means and in an alternate design by hook means positioned on vacuum device;

the second upper seam closing partially the bag mouth on bag distal end; the remaining open mouth space on bag proximal end providing a neck arrangement, said neck arrangement selected from the group of open fixed-size neck arrangement and of closed neck arrangement but openable to a selectable size, said openable neck arrangement provided by having the bag mouth closed full-width by said second upper seam and a partial-width perforation line extending below said empty space and just below said upper seam on bag proximal end; the extent of tearing of the length of a bag strip just above and along said perforation line determining the opening width of said bag neck arrangement to allow a vacuum connector discharge end to enter the bag neck arrangement;

upper seam eliminating the need for further tying of a filled bag when the bag neck is relatively small, an arrangement that maximizes bag holding capacity; and when said bag strip is cut long to provide a wide neck arrangement, said long bag strip is usable as a wide necked band for tying the filled bag;

bag neck arrangement further comprising a neck configuration provided by adding the horizontal upper seam to take a configuration selected from the group of configurations that are bordered by a seam that is vertical straight-lined downward-oriented, vertical straight-lined upward-oriented, oblique straight-lined upward-oriented combinations thereof;

third bottom seam that holds bag content, said bottom seam incorporating, in an alternate drainable bag design, a wide U-shaped bottom seam which integrates in said bottom seam, the contour of two drainage exit portals, each of said drainage exit portals located at one side of bag bottom corners, said portals openable by tearing locally an associated segment of the bottom seam, said tear best achieved by pulling a tearable pull tab that releases liquids trapped above the bottom seam, said pull tab delimited by two peripheral notches.

6. The disposable perforated bag of claim 27 wherein said bag is made from materials consisting from the group of plastic film about 1-6 mil thick made of polyethylene, of polypropylene, of biodegradable plastic, of paper, of cellulose, of edible materials consumable by any of a variety of grazing animals and combinations thereof.

7. A carryable, universal size neck, disposable perforated leaf bag able to receive, collect, bag and handle in a single-step leaves and debris discharged from a hand-held portable vacuum device, said bag comprising:

plural perforated holes of substantially 1-6 mm in diameter but preferably 4 mm or 0.1574 inch in diameter to vent air, said holes distributed over the bag following a pattern selected from the group of patterns wherein holes are located preferably in at least half of bag upper section, where holes are located on the entire surface of the bag, where holes are located in at least half of bag upper section with exception of one line of holes at the bottom, with said line of holes covered with a detachable adhesive tape and combinations thereof;

the bag having plural generally horizontal seams comprising:

an upper seam closing full-width said bag mouth and a perforation line extending full-width just 1-3 cm below said upper seam, the extent of tearing of a bag strip located just above and along said perforation line determining the neck width arrangement that allows a connector discharge end to be inserted in the bag neck arrangement;

a second bottom seam that holds the bag content;

elongated segment of the bag seizable by an elongated fastener able to carry the bag
sliding it along a bag top section preferably under the perforation line;

. The apparatus of claim 27 wherein said perforated bag provides a disposable inner
lining for placing disposable bags inside permeable containers selected from the group of
reined containers, netting type support frames, fibrous filters, containers having walls
made of metal mesh, expanded metal, metal lathe, structural plastic mesh, and
combinations thereof.

G. 1

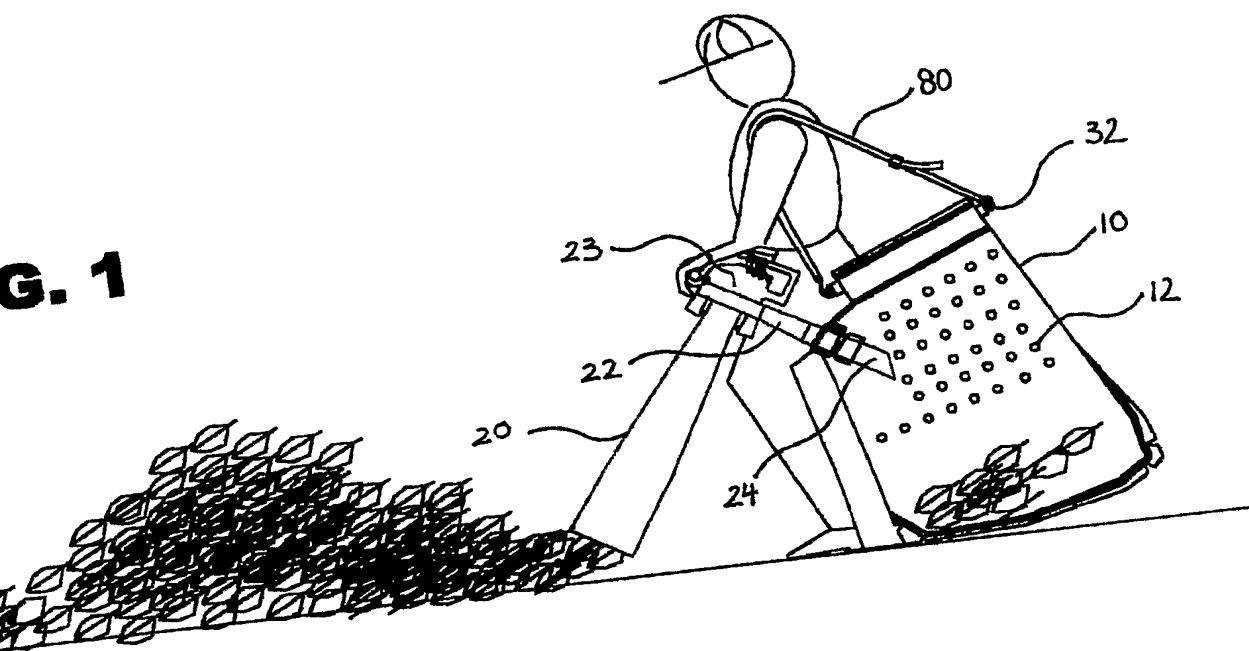
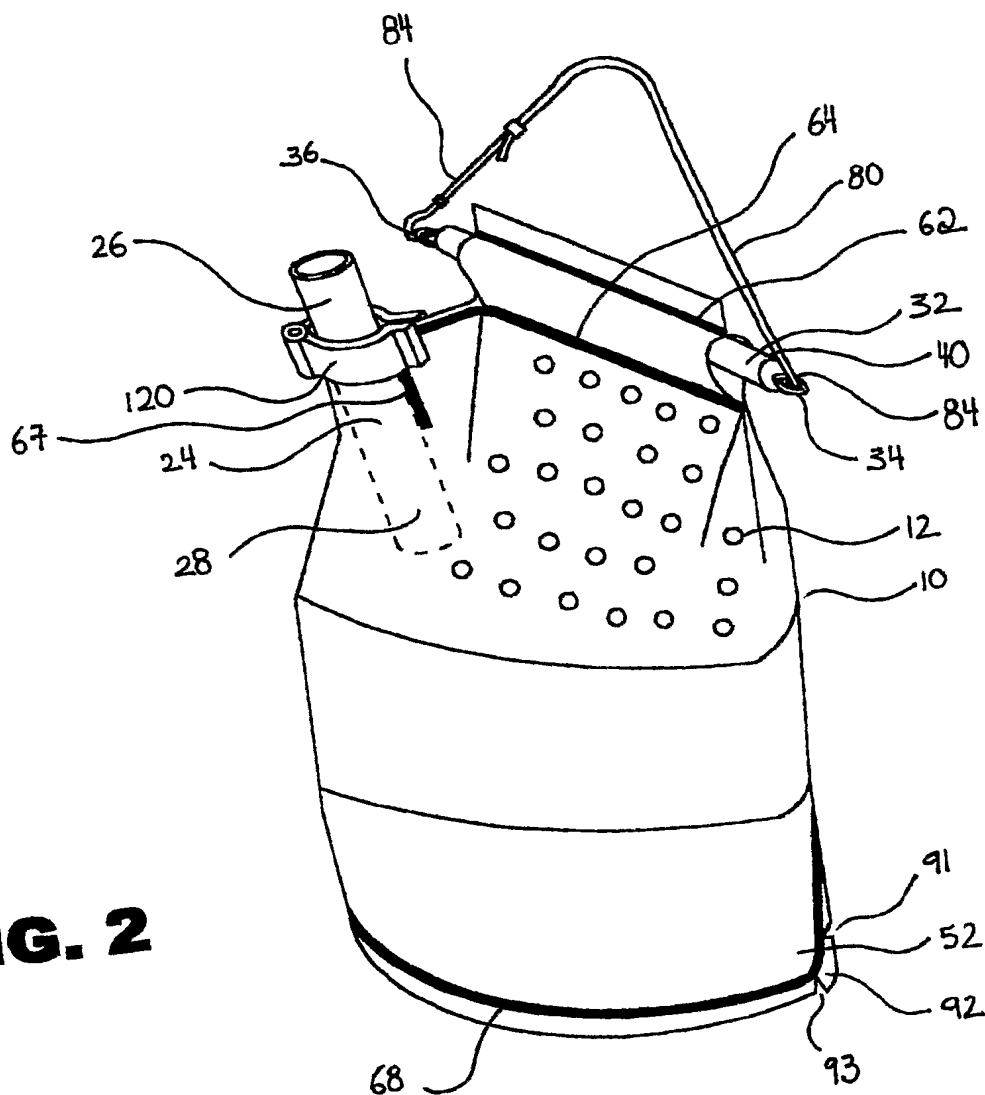


FIG. 2



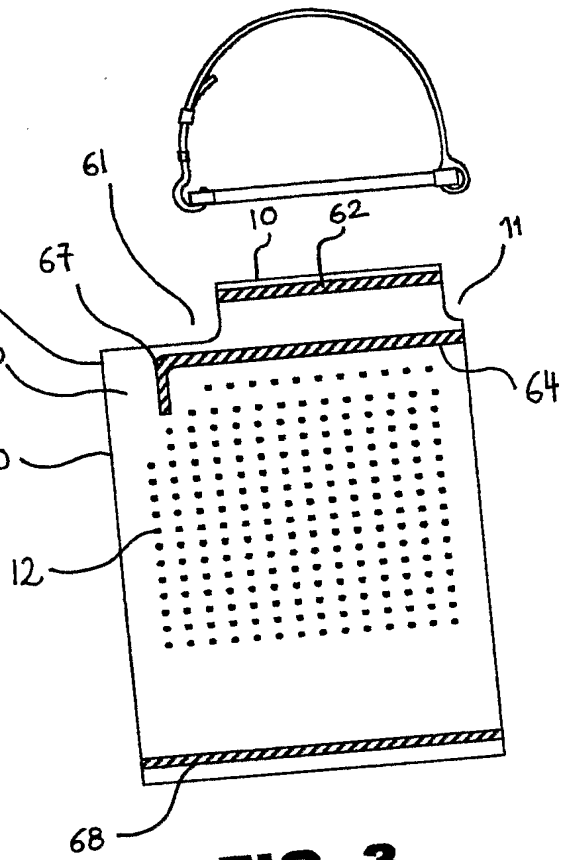


FIG. 3

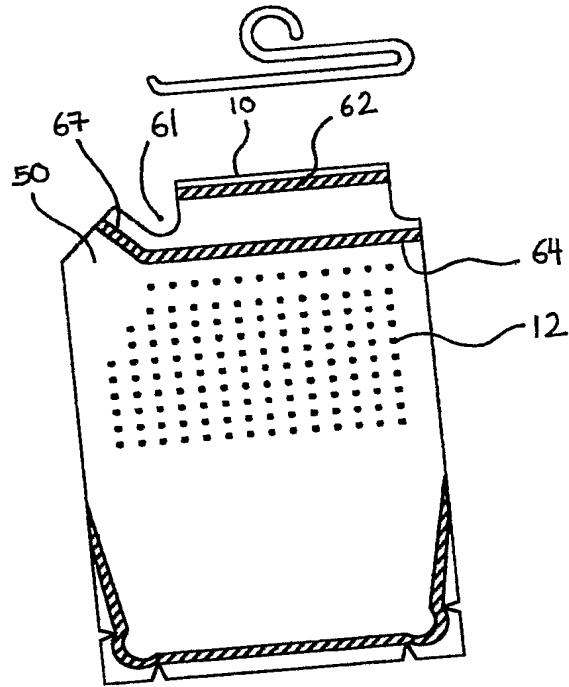


FIG. 4

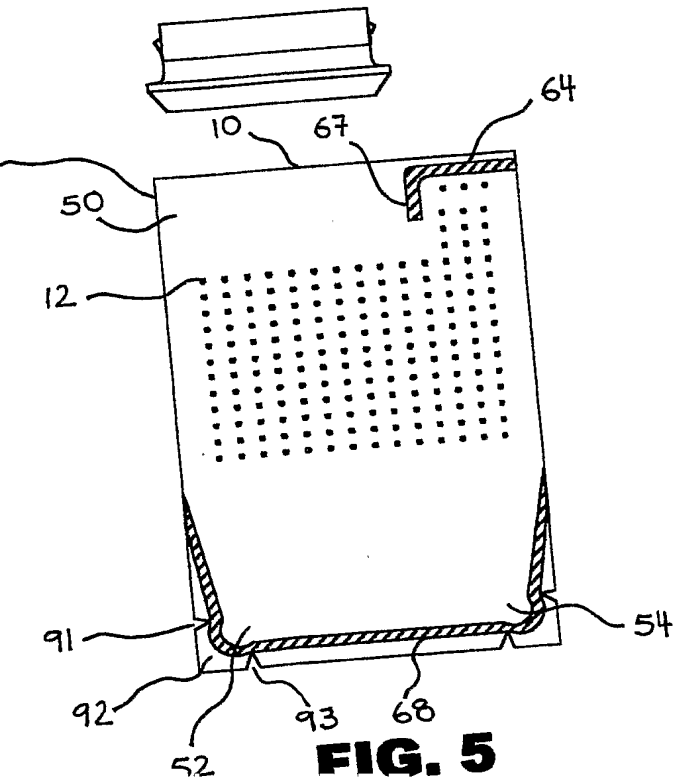


FIG. 5

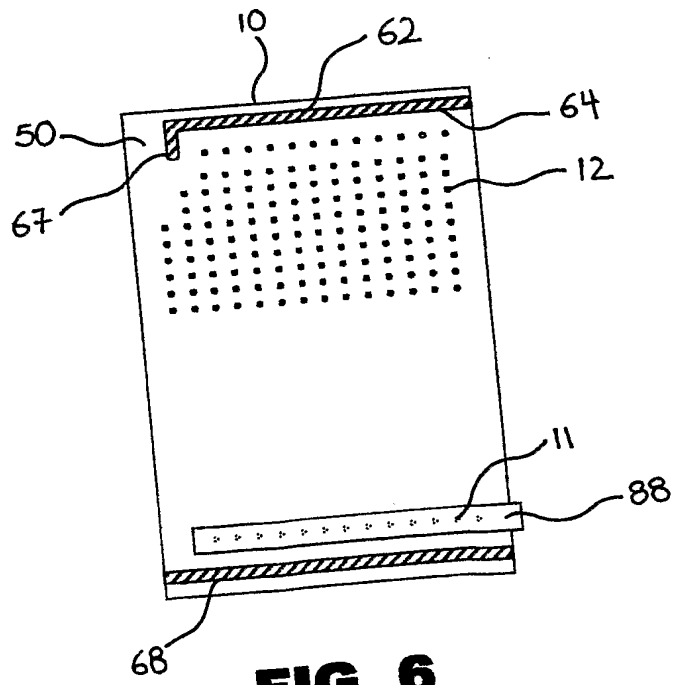


FIG. 6

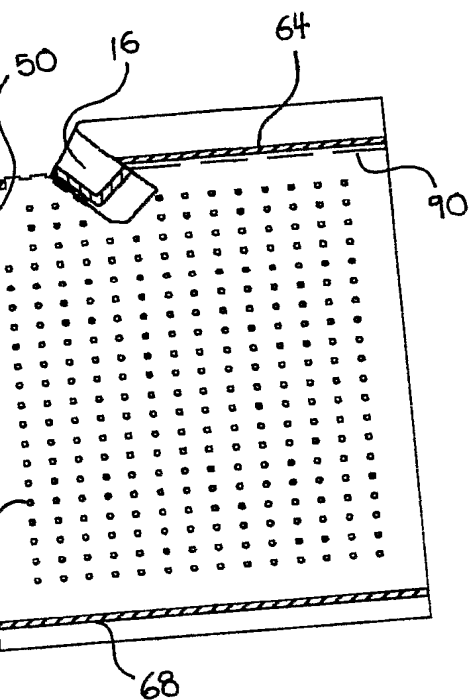


FIG. 7

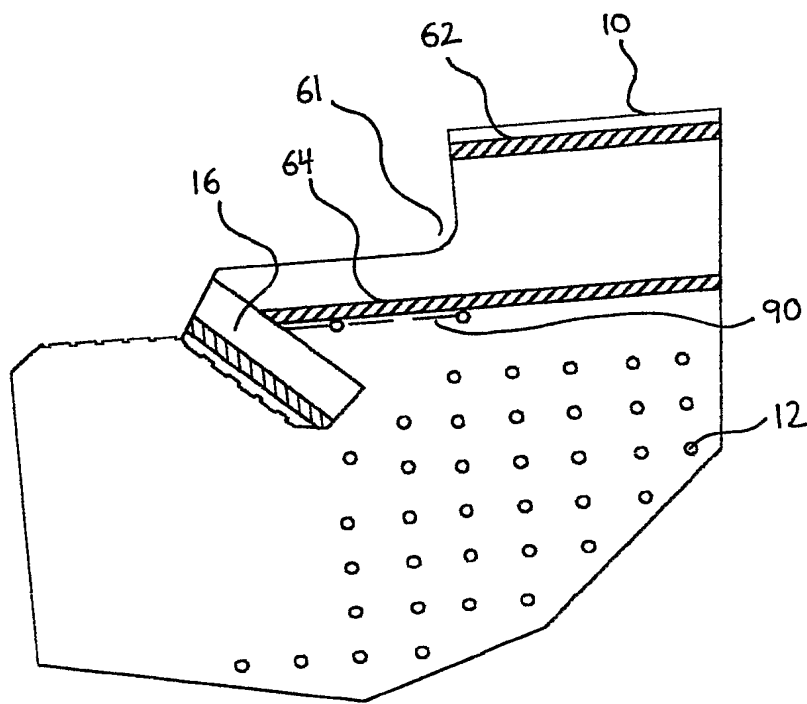


FIG. 8

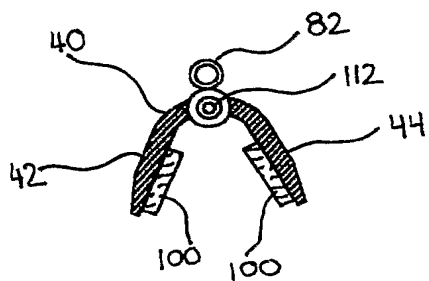


FIG. 9

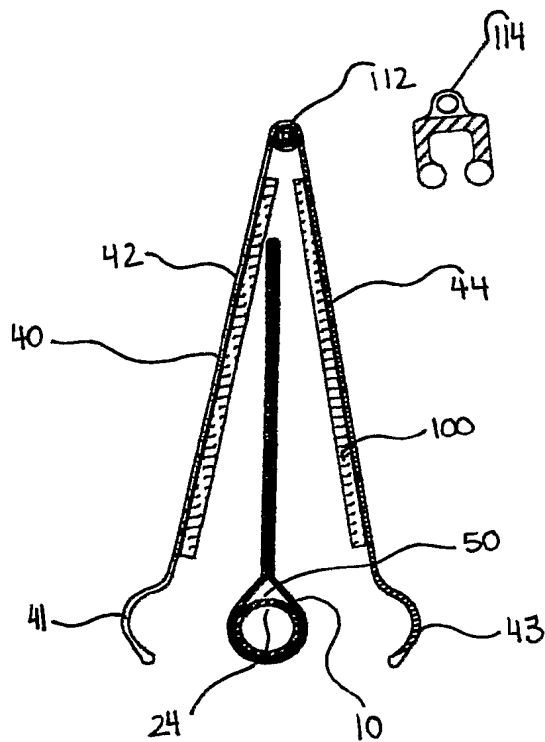


FIG. 10

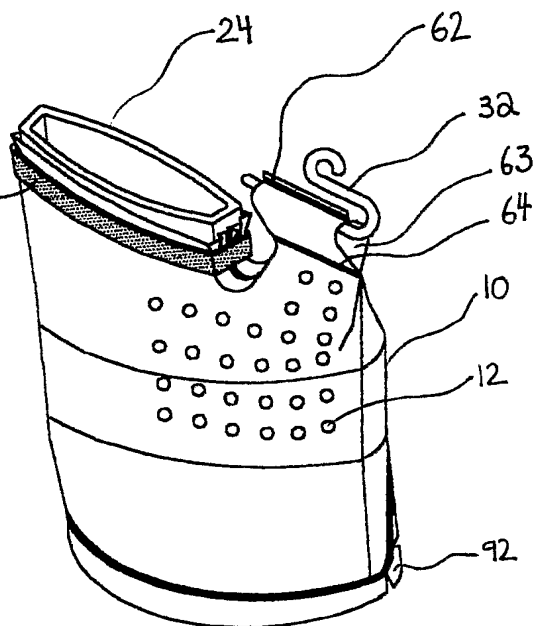


FIG. 11

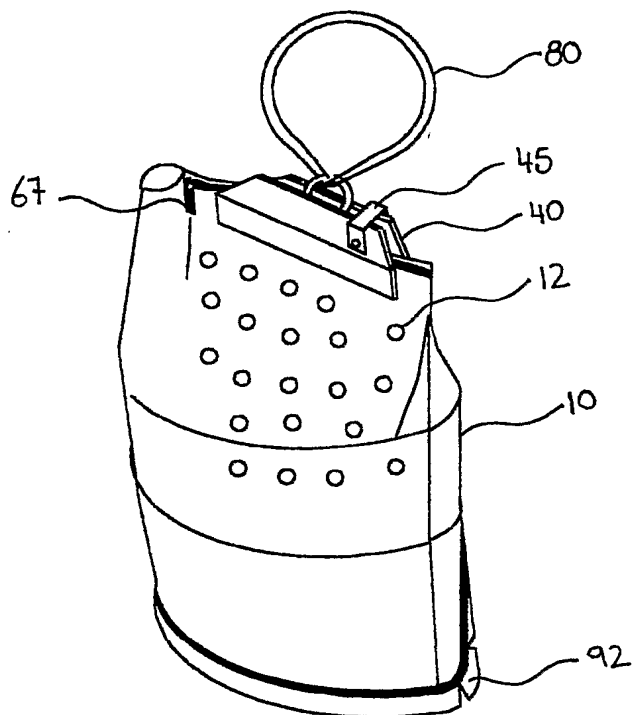


FIG. 12

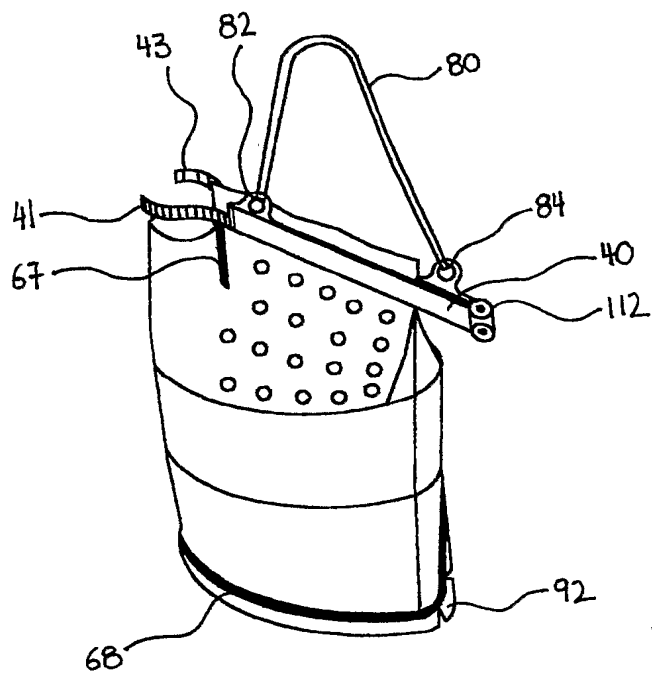


FIG. 13

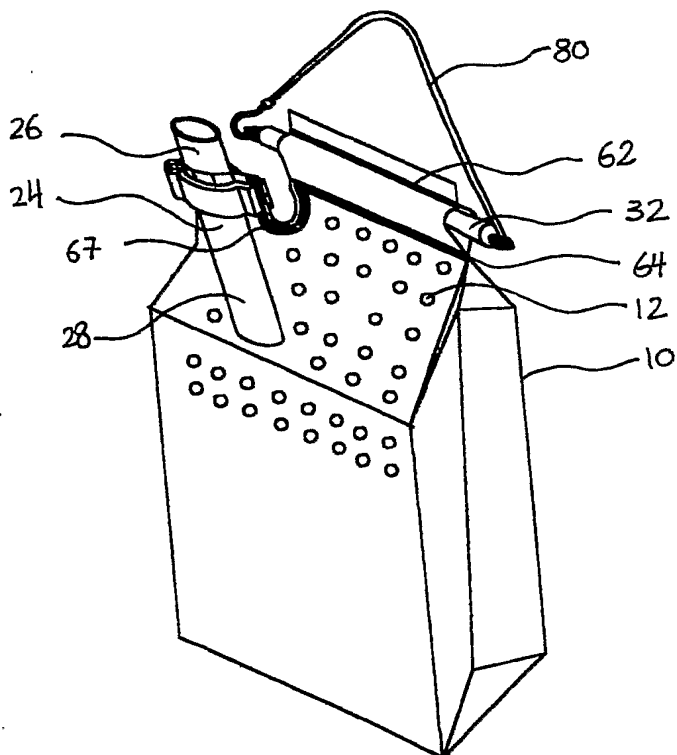


FIG. 14